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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/057,952	01/29/2002	Akio Nakayama	218433US2	3574

22850 7590 04/07/2003

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
FOURTH FLOOR
1755 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 22202

EXAMINER

DI GRAZIO, JEANNE A

ART UNIT PAPER NUMBER

2871

DATE MAILED: 04/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/057,952

Applicant(s)

NAKAYAMA ET AL.

Examiner

Jeanne A. Di Grazio

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

Priority to JP-2001-028982 (Feb. 6, 2001) and JP-2001-229099 (July 30, 2001) is claimed.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant claims a cumulative capacitance for stabilizing pixel potential during the holding period formed between the second pixel electrode and a storage capacitance electrode and/or between the second pixel electrode and the preceding gate line adjacent thereto. The expression “and/or” renders the claim indefinite such that a person of ordinary skill in the art would not be apprised of the exact scope of the claim.

Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant claims that the region in the first pixel electrode that does not overlap the second pixel electrode is from several to several tens in percentage with respect to the area of the opening effective for the display. One of ordinary skill in the art would not be apprised of the scope of the claim because “from several to several” renders the precise nature and scope of the claim unclear.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US '611 B1) in view of Matsuo (US '490).

Per claim 1: Kim has pixel electrodes made of first and second pixel electrodes where the second pixel electrode is above an insulating layer and a layer above a first pixel electrode and there is a region where first and second pixel electrodes do not overlap with each other (See Figure 4B). Furthermore, first and second pixel electrodes are electrically connected with each other (Col. 2, Lines 52-64). Kim does not appear to specify transistors at intersections of gate and source lines and pixels connected with the transistors; however, Matsuo has these general elements (Col. 2, Lines 1-19). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim in view of Matsuo for switching because transistors (that typically have gate and source lines and connected pixels) are commonly used as switching devices. Kim does not appear to have opposite electrodes opposite pixel electrodes and liquid crystal in between the opposite and pixel electrodes; however, Matsuo has these elements [ABS]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim in view of Matsuo in part for a simplified manufacturing process as noted in Matsuo and for switching.

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Per claim 6: Kim (611) has a prior art pixel electrode in the same layer as the drain electrode (Figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a first pixel electrode in the same layer as the drain electrode if so desired for manufacturing ease and convenience.

Per claim 16: Kim et al. discloses the method steps as claimed in claim 16 of manufacturing a first pixel electrode, an insulating layer above the first pixel electrode, and a second pixel electrode above the insulating layer where the second pixel electrode has a region that does not overlap the first pixel electrode and being electrically connected to the first pixel electrode. Kim does not appear to have liquid crystal between opposite and pixel electrodes; however, Matsuo has these elements as noted and transistors with gate and source lines and pixels connected to the transistors as noted. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim in view of Matsuo for switching as noted.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US '611 B1) and Matsuo (US '490) in further view of Kim et al. (US '516 B1).

Per claim 2: Kim (611) does not appear to have a cumulative capacitance for stabilizing pixel potential during the holding period formed between the second pixel electrode and a storage capacitance electrode and/or between the second pixel electrode and the preceding gate line adjacent thereto; however, Kim (516) has storage capacitance obtained between the storage line and the first pixel electrode and between the gate line and the second pixel electrode (Col. 3, Lines 34-38). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim (611) in view of Kim (516) to reduce parasitic capacitance

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thereby reducing signal delay and thus fast operation of the LCD device is possible (Col. 3, Lines 39-47).

Per claim 3: Kim (611) does not appear to specify that the first pixel electrode is in the same layer as the gate line; however, Kim (516) has a first pixel electrode in the same layer as a gate line (Figure 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim (611) in view of Kim (516) for manufacturing ease and efficiency and reduced process steps.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US '611 B1) and Matsuo (US '490) in further view of Nishikawa et al. (US '782).

Per claim 4: Kim (611) does not appear to specify an insulating film below a gate line and a first pixel electrode below the insulating film; however, Nishikawa has an insulating film below a gate line and pixel below the insulating layer [ABS]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim (611) in view of Nishikawa to prevent short-circuiting as noted in Nishikawa.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US '611 B1) and Matsuo (US '490) in view of Hirashi (US '771 B1) in further view of Hirabayashi et al. (US '204 B1).

Per claim 5: Kim (611) does not appear to have a first gate insulating film above a gate line and first pixel electrode in a layer above a first gate insulating film; however, Hirashi has these elements (Figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim in view of Hirashi for manufacturing ease and simplicity. Kim (611) does not appear to have a second gate insulating film in a layer above the

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first pixel electrode, and interlayer insulating film in the layer above the second gate insulating film and second pixel electrode in a layer above the interlayer insulating film; however, Hirabayashi has these general elements (Col. 14, Lines 30-41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim (611) in view of Hirabayashi to stabilize and improve electrical characteristics of the various elements (Col. 2, Lines 1-5).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US '611 B1) and Matsuo (US '490) in further view of Sasaki et al. (US '213).

Per claim 7: Kim (611) does not appear to specify that the first pixel electrode is electrically connected to the drain electrode of the transistors; however, Sasaki discloses a prior art Japanese Patent Application that has a first pixel electrode connected to a drain electrode (Col. 3, Lines 51-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim (611) in view of Sasaki to eliminate the need for another process of forming a contact hole through which the second pixel electrode directly contacts the drain electrode thereby simplifying the process, reducing the number of process steps, and improving yield.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US '611 B1) and Matsuo (US '490) in further view of Sakamoto et al. (US 2001/0019392 A1).

Per claim 8: Kim (611) does not appear to have a second pixel electrode with an opening through which an insulating film and liquid crystal are held between the pixel electrode and opposite electrode in that opening; however, Sakamoto has a pixel with a slit through which liquid crystal domains are formed in the pixel and additional insulating films may be disposed

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under the pixel if so desired [0043] and [0037]. Sakamoto also has opposite electrodes [0043]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim (611) in view of Sakamoto for a multi-domain LCD with excellent viewing characteristics as noted in Sakamoto [0016].

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US '611 B1) and Matsuo (US '490) in view of Ohkawara et al. (US '325 B1).

Per claim 9: Kim has pixel electrodes made of first and second pixel electrodes where the second pixel electrode is above an insulating layer and a layer above a first pixel electrode and there is a region where first and second pixel electrodes do not overlap with each other (See Figure 4B). Kim does not appear to specify transistors at intersections of gate and source lines and pixels connected with the (drain electrodes) transistors; however, Matsuo has these general elements (Col. 2, Lines 1-19 and Col. 1, Lines 32-34). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim in view of Matsuo for switching because transistors (that typically have gate and source lines and connected pixels) are commonly used as switching devices. Kim does not appear to have opposite electrodes opposite pixel electrodes and liquid crystal in between the opposite and pixel electrodes; however, Matsuo has these elements [ABS]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim in view of Matsuo in part for a simplified manufacturing process as noted in Matsuo and for switching. Kim does not appear to have first and second pixel electrodes electrically connected with drain electrodes; however, Ohkawara has this arrangement (Col. 2, Lines 39-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim in view of Ohkawara for an LCD of

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excellent contrast and particularly applicable to and compatible with color LCDs (Col. 1, Lines 28-30).

Per claim 10: Kim (611) has a region where first and second pixel electrodes do not overlap that appears to be large with respect to an opening of the display (Figure 4B). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include this recitation for controlling line width and improving reliability as noted in Kim (611) (Col. 2, Lines 43-46).

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US '611 B1) and Matsuo (US '490) and Ohkawara et al. (US '325 B1) in further view of Zhang et al. (US '461).

Per claim 11: Kim (611) does not appear to have an insulating layer thickness of 500 nm or greater; however, Zhang has an insulating film that can range in thickness from 500 nm to 3.0 micrometers (Col. 10, Lines 1-5 and Col. 9, Lines 38-39). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim (611) in view of Zhang to prevent cracking and for desired optical properties.

Per claim 12: Kim (611) has first and second pixel electrodes of ITO (Col. 2, Lines 65-67). Pixel electrodes that are transparent are common in the art (See, Matsuo at Col. 8, Lines 42-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the pixel electrode of a transparent electrode where such is commonly done in the art for manufacturing ease and simplicity.

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Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US '611 B1) and Matsuo (US '490) and Ohkawara et al. (US '325 B1) in view of Lim et al. (US 2002/0109652 A1).

Per claim 13: Kim (611) does not appear to have a ratio of voltages applied to first and second pixel electrodes of 0.5:1.0 to 0.9:1.0; however, Lim has voltages charged in first and second pixel electrodes that become equal to each other [0043]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim (611) in view of Lim for equivalent / similar coupling between first and second pixel electrodes as noted in Lim [0042 and 0043].

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa et al. (US '694 B1) in view of Numao (US '919 B1).

Per claim 14: Nishikawa has alignment layers on both substrate surface sides (Col. 4, Lines 20-25). The liquid crystal molecules are aligned by the alignment layers (Col. 4, Lines 25-30). Nishikawa also has two polarizing plates on both sides of the liquid crystal cell and one or two optical compensatory sheets between the liquid crystal cell and polarizing plate (Col. 3, Lines 12-17). Nishikawa does not appear to have means for applying different voltages to one pixel; however, Numao has one pixel electrode for which different voltages are applied to that one pixel (Col. 17, Lines 5-19). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Nishikawa in view of Numao for gray scale display capabilities and high contrast (Col. 17, Lines 17-19).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa et al. (US '694 B1) and Numao (US '919 B1) in view of Kagawa et al. (US '385 B1).

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Per claim 15: Nishikawa does not appear to specify a product of birefringence and thickness of $0.30 \mu\text{m} \leq \Delta n * d \leq 0.50 \mu\text{m}$; however, Kagawa has a product of birefringence and thickness in the range of: $0.2 \mu\text{m} < d * \Delta n < 0.4 \mu\text{m}$ (Col. 4, Lines 36-38). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Nishikawa in view of Kagawa for maximum intensity of transmitted light and for practicability (Col. 9, Lines 44-62).

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US '611 B1) and Matsuo (US '490) and Sasaki et al. (US '213) in view of Ohkawara et al. (US '325 B1).

Per claim 17: Kim (611) has the step of manufacturing an insulating layer above the first pixel electrode, and a second pixel electrode above the insulating layer where the second pixel electrode has a region that does not overlap the first pixel electrode as noted. Kim (611) does not appear to have liquid crystal between opposite and pixel electrodes; however, Matsuo has these elements as noted and transistors with gate and source lines and pixels connected to the transistors as noted. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim (611) in view of Matsuo for switching as noted. Kim (611) does not appear to have the step of manufacturing a first pixel electrode electrically connected with a drain electrode; however, Sasaki discloses a prior art Japanese Patent Application that has a first pixel electrode connected to a drain electrode (Col. 3, Lines 51-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim (611) in view of Sasaki to eliminate the need for another process of forming a contact hole through which the second pixel electrode directly contacts the drain electrode thereby

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simplifying the process, reducing the number of process steps, and improving yield. Kim (611) does not appear to have the step of a second pixel electrode electrically connected with a drain electrode; however, Ohkawara has this arrangement (Col. 2, Lines 39-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim (611) in view of Ohkawara for an LCD of excellent contrast and particularly applicable to and compatible with color LCDs (Col. 1, Lines 28-30).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (703)305-7009. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703)746-8741 for regular communications and (703)746-8741 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Jeanne Andrea Di Grazio

Robert Kim, SPE

JDG
March 26, 2003


TOANTON
PRIMARY EXAMINER